

Cloud Business Intelligent Computing

A competitive advantages for vertical and horizontal systems

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Abstract—The traditional business environment has shifted to Internet of Things (IoT) environment. Competitive advantaging factors are currently very influenced by phenomena of IoT. Cloud computing is an Internet service that provides computing needs to computer users. The cloud computing in business gives many benefits in new business creation and business development opportunities. An adoption of cloud computing in business may add the competitive advantaging factors in short cut way. However, the implementation benefit must surpass the costs of capital and compensate the risk associated to the implemented system.

Keywords- cloud business systems; cloud computing benefits; trust management ; cloud service maturity; business intelligent

I. INTRODUCTION

The discussion of global business competitiveness may cover the five regions: Europe and North America, Asia and the Pacific, Latin America and the Caribbean, the Middle East and North Africa, and sub-Saharan Africa. Moreover, the topics of Information System may have been discussed under a variety of different names such as Management Information Systems, Computer Information Systems, Information Systems Management, Business Information Systems and many other names. However, this paper will narrow the scope in cloud computing as business information systems.

Two rankings of the competitiveness of nations are usually referred by many communities. They are rankings from the World Economic Forum (Global Competitiveness Report) and International Institute for Management Development (World Competitiveness Yearbook). Indeed, many countries whose ranking have been down try to restore their competitiveness. On the other hand every country always improves their competitiveness and up their ranking. Many developed countries' elites may debate to call both government and business to action. The recommendations have been proposed such as a need for corporate tax reform, a re-evaluation of fiscal policy, a hard look at immigration rules and incentives, and a push for open market trade around the world. For the case of Indonesia, experts may analyze an issue of regulatory uncertainty, growing resource nationalism, unfavourable licensing terms, and allegations of corruption.

Interestingly and separated from the above issues, the competitiveness issues are currently very influenced by phenomena of cloud computing, Web information, mobile

devices, and social media innovations. The widespread use of virtualization enables more efficient use of computing resources by allowing enterprises to consolidate workloads and dynamically allocate resources as needed, based on business requirements.

The definition of cloud computing provided by U.S. NIST (National Institute of Standards and Technology) is:

"Cloud computing is a model for enabling convenient, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction"

II. TRADITIONAL ENTERPRISE TO CLOUD BUSINESS SYSTEM

With the emergence of cloud computing IT environment in a business can be challenging. IT professionals are forced to rethink their existing approach to accommodate the new requirements to keep the competitiveness and to better manage modern IT systems. The traditional business environment as seen in Figure 1, may shift to Internet of Things (IoT) environment as illustrated in Figure 2 that is happening nowadays [1]. The internet does not only connect business players and communities, but it is also a factor of foundation global economy.



Figure 1. Traditional business environment.

From the human personalities, traditional and current business environment are not significantly different. Both of mobile and fixed line phone need communication skills from employees and business players. Both hard-copy and paper-less filing need logical data-base from officers. Therefore, it is very clear that to be a winner in business with very tough competition a nation needs citizens with very good human characters.



Figure 2. Nowadays business environment.

In addition, the business environment has moved to two directions both moved vertical and horizontal directions. The vertical direction has concern of business matters and horizontal direction has seemingly a kind of supply-chain integration of systems to ensure the correct dissemination of

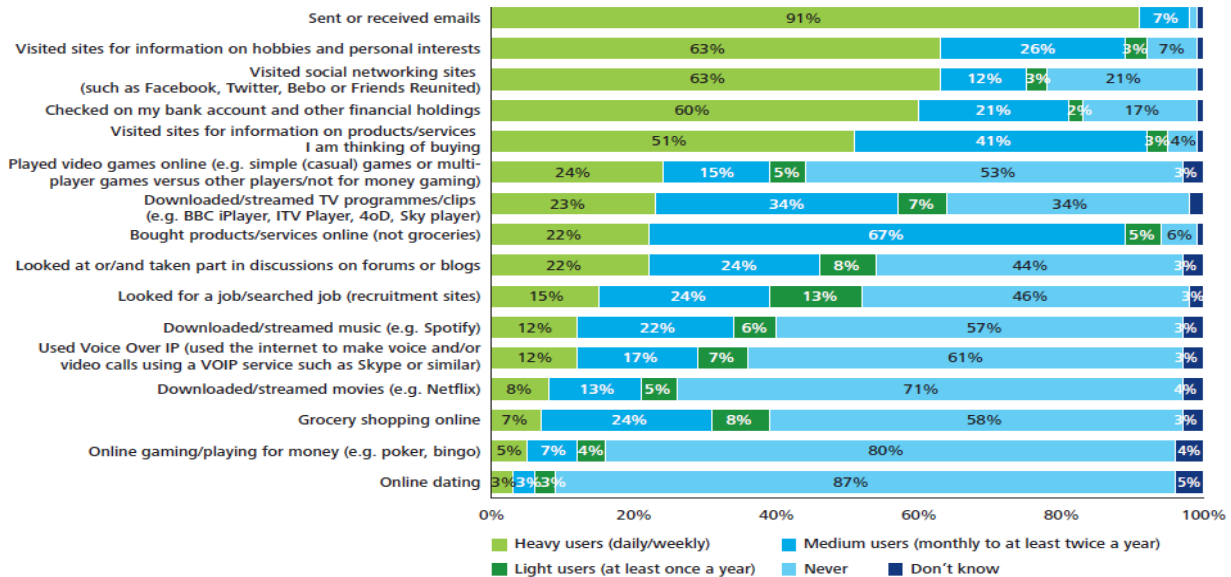
information throughout the value-chain of a business. Making use of appropriate technology like the Internet to ensure that real-time accurate information is available at all decision points throughout an organization and supply chain.

Cloud computing is an Internet service that provides computing needs to computer users. On the other hand, cloud business intelligent computing can mean many things from e-procurement, B2B, B2C, industrial Ethernet, portals, TCP/IP, UDP, XML, collaborative manufacturing, wireless and embedded web servers, to supply chain management (SCM).

Both vertical and horizontal directions have a synergy to create a new innovative system. These both directions system could be named as Cloud Business Intelligent Systems (CBIS). A business system is becoming an intensive and extensive IT in sense of cloud computing. The CBIS' challenges would be:

1. Society drivers
2. Security
3. Seamless integration.

Those three challenges may become opportunities or threats. In society drivers, some cases of social media that have been on a mission to make the world more open and connected have driven the society. Thus, social media business players like Facebook and Twitter have grasped the opportunities and they have been able to list their shares in stock exchange markets. As the consequences, security issues have been changing their priorities. Since the security failure tends to escalate an effort to control personal devices and infrastructure the seamless integration become information security priorities. Even though, the growth of social media is very fast but sending or receiving emails is still the top of frequency of online activities, as visualized in Figure 3.



Source: Deloitte research, January 2013
Base: UK Consumers (n=2018)

Figure 3. Frequency of online activities [2]

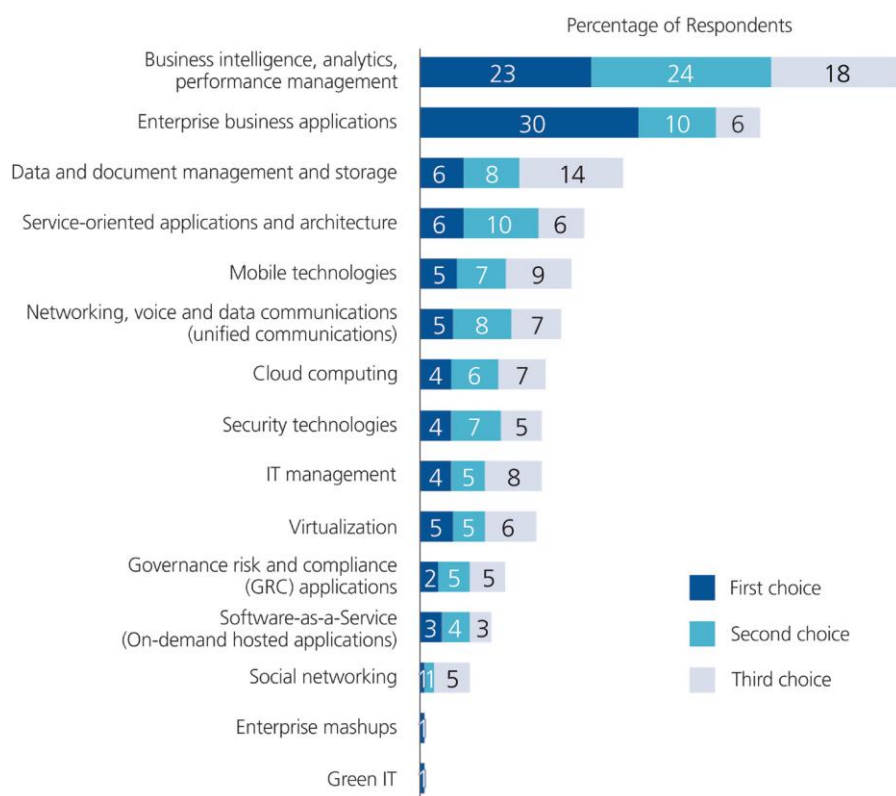
Indeed, a business has been focusing on Business Intelligent [3] as reported in Figure 3. Unfortunately, Green IT has not been favoured anymore. It does not mean Green IT or Green Technology has not been a concern longer but the green has been redefined and has immersed in any aspects of business direction.

To help business players embrace the cloud for mission-critical applications rather than only for an economical test and development platform, cloud providers have to design the right infrastructure, whether they're entrenched telecom providers, newer cloud specialists or niche providers.

To fully exploit the potential benefits of cloud computing IT teams need to seamlessly integrate, automate, and standardize infrastructure operations and provisioning

activities across server, storage, and network resources. However, in a cloud computing environment, it is not possible to run every application on every machine due to resource constraint. For e-commerce applications, physical memory is typically the bottleneck resource that limits how many applications a server can run simultaneously. This limit is usually modelled explicitly in an algorithm as the class constraint and can be enforced by the cloud service provider.

Business Intelligence (BI) is now on top of finance's agenda



Source: Gartner (May 2011)

Figure 4. Finance's agenda

III. CLOUD BENEFITS

The top two soft benefits of cloud computing in business are new business creation and business development opportunities [4] as seen in Table I. With a proper Internet connection, people can log in to the cloud from anywhere in

the world and access applications. Setting up accounts for users is generally quick and easy. Thus business creation and business development opportunities are more possible.

TABLE I. CLOUD FINANCE & BUSINESS SERVICES BENEFITS

Finance & Business Services							
Benefits	France	Germany	Italy	Spain	UK		EMEA
	€M	€M	€M	€M	€M	€M	€M
Business development opportunities	7,809	10,240	5,362	2,921	9,526	8,129	35,858
Business creation	17,696	22,647	12,882	7,403	6,831	5,829	67,458
Net total cost savings of which:	1,688	4,151	1,571	1,279	1,716	1,464	10,405
-IT CapEx savings	4,262	4,902	2,840	1,390	4,777	4,076	18,171
-IT OpEx savings	2,795	3,411	1,861	965	3,166	2,702	12,198
-IT OpEx savings (power and cooling)	2,303	2,809	1,533	795	2,241	1,912	9,681
-Additional cloud expenditure (PAYG)	-7,671	-6,971	-4,664	-1,871	-8,468	-7,225	-29,645
Indirect GVA	16,756	21,465	12,259	7,234	12,131	10,351	69,844
Total Economic Benefit	43,949	58,503	32,073	18,836	30,204	25,773	183,566
Direct and indirect employment (000s)	37.17	55.85	29.98	29.00	54.72		206.73

Source: Cebr analysis

CEBR's report found that, across the five economies as a whole, widespread adoption of cloud computing has the potential to generate over €763 billion of cumulative economic benefits over the period 2010 to 2015. The shares of these aggregate cumulative benefits that are attributable to each of the industry sectors are the subject of this report [4], and are shown in Table II below for the EMEA area as a whole and for each of the EMEA economies. Some people

argue that what the cloud computing can do on-premise can also accomplish but some cloud benefits have been identified [5]. There are:

1. Making individual more productives.
2. Facilitating collaboration.
3. Mining insight from data.
4. Developing and hosting applications.

Therefore, cloud computing can offer more competitive advantages than on-premise enterprise can do (Table III).

TABLE II. CLOUD CUMULATIVE ECONOMICS BENEFITS

EMEA: Cumulative Economic Benefits 2010-2015							
Industry sector	France	Germany	Italy	Spain	UK	EMEA	Jobs
	€ mil	€ mil	€ mil	€ mil	€ mil	€ mil	('000s)
Banking, financial & business services	43,949	58,503	32,073	18,836	30,204	183,566	207
Government, education & health	25,783	31,838	20,759	14,704	19,455	112,539	801
Distribution, retail & hotels	45,901	55,540	51,688	40,125	40,162	233,418	355
Manufacturing	16,013	39,305	19,735	12,093	11,358	98,504	514
Other sectors ¹	31,103	36,052	26,515	24,792	16,810	135,271	519
Total Economic Benefit	162,749	221,239	150,770	110,550	117,989	763,297	2,396
Direct and Indirect employment ('000s)	469	789	456	392	289	2,396	

¹ Other sectors include agriculture, forestry & fishing, energy & utilities, construction, transport, communications & storage, and all other activities

Source: Cebr analysis

TABLE III. CLOUD AND ON-PREMISE COMPETITIVE ADVANTAGES

	Competitive Advantages	Cloud	On-Premise
1	Business decentralization	Yes	No
2	Distributing business creation	Yes	No
3	Enabling business velocity without scaling a cost structure	Yes	No
4	Mobile workforce empowerment	Yes	No
5	Equipping employees for self-service	Yes	No
6	Focusing IT spend on innovation	Yes	No

These competitive advantages should be implemented to business players in any countries who are willing to upgrade their competitiveness ranking. However, a research of cloud computing adoption is very rare in Indonesia. In fact, Indonesia is one of the developing countries which has largest number of Small Medium Enterprises (SMEs). In 2009, Central of Statistics Bureau of Indonesia (BPS) mentioned there were 52.8 million SMEs in Indonesia and contributed 58.05% on GDP (Gross Domestic Product). More over, SMEs provided employment to 97.30% of people [6].

However, the cloud computing adoption by SMEs would need very large participation in ICT adoption as an initial stage and may shift SME's workforce [7]. There are some stages to adopt the cloud computing. Three stages were suggested [8]:

1. Increased participation.
2. Increased scientific adoption.
3. Tracking technology .

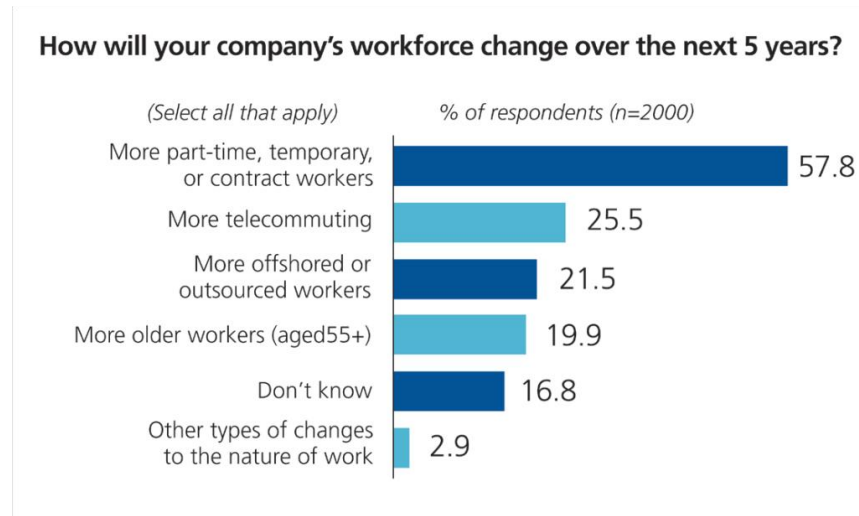


Figure 5. Workforce Change

IV. ISSUES AND CHALLENGES

Some experts and practitioners from across industries, including education, consulting and pharmaceuticals have their cloud computing success stories but some of them have different stories.

A. Success stories

The potential cost savings of cloud computing have inspired many nonprofits to make the jump.

Anant Agarwal, a professor of engineering and computer science at MIT in Cambridge, Mass., president of edX, an online digital learning platform that is redefining the educational system. EdX has made the jump by redefining education with digital learning in the cloud. The mission of

edX is to create an online learning platform that will host courses from universities like MIT and Harvard -- branded under the names MITx and HarvardX, respectively -- and from other universities around the world -- offering this to millions of students worldwide. Through Cloud Education System, educating billions of students worldwide with very affordable worldwide become a reality and can really make a change in the world.

Facing a recession and the need to cut costs, Boston-based staffing and consulting agency Aquent LLC looked to the cloud. They decided to go into moving almost all of the company's front-office applications to the cloud. They have managed and promoted radical, technology-driven change through entrepreneurialism, and focused on the agency's recent move to Software as a Service and other IT services.

B. Stories of cloud computing cautions

Some bugs disrupted banking and healthcare payment systems. One of the latest software errors that had widely noticed consequences was Google's Gmail outage in February 2012. The problem in that case was, according to Google, a bug in the software that distributed load between its different data centres.

A leading multinational corporation's cloud computing service outage, which affected Governments and consumers, was caused by the additional day in February 2012. The same leap year date bug also affected an Australian payment system used by the health industry, resulting in 150,000 customers being prevented from using private health care cards for medical transactions for two days.

The Gmail outage only resulted in people not having access to their email for a few hours. Incidents that make the Gmail outage seem rather trivial.

C. IT agility through cloud computing services

Empowering workers with agile communications is one of some faced challenges. The concept of empowering a workforce with agile IT extends to communications. Gartner predicts that social networking services in the cloud will replace e-mail as the primary vehicle for communications for 20% of business users by 2014.

Gartner is the world's information technology research and advisory company. It delivers the technology-related insight necessary for clients to make the right decisions.

D. Stories of trust management

Trust management is an advent emerging issue in cloud computing. Some trust management issues such as identity verification, privacy data, personalization, security and auto-scaling ability need to be addressed. A comparative study between Zalora online shopping in some Asian countries and Parkson online shopping in Malaysia, Zalora has been purposely created to be online fashion shopping a few years ago and Parkson Online Warehouse Sdn. Bhd was

established in 2011 long years after the establishment of Parkson Corporation Sdn.Bhd in 1987. Both Zalora and Parkson build networking with top brands supplier. Zalora put large money for advertisement for online shopping destination but Parkson Online is a kind of expansion from their department store and also has a function of warehouse that they save the product.

Trust management for both of them must include the guarantee of quality. Customers must be allowed to return their orders with logical reason such as *look different to image on web site, poor quality/faulty, does not fit properly, incorrect item received and items damaged on arrival*. A replacement or refund and exchanging the item and sending it back to customers should be done within acceptable working days duration.

V. STRATEGIC ISSUES

A good strategy to manage cloud compliance is to establish a clear and transparent relationship with a cloud service provider. This can be facilitated by standards such as the SSAE 16 SOC 2 or ISO 27001. It cannot be denied, there might be a concern that despite the cloud is able to control in many physical locations, which can be verified on paper, the human element of managing controls can still cause controls to drift out of place and warrant on-site audits.

It would not be surprising that developers of services and product are the driving innovators in the cloud computing. Their creativity would be upper than their caution.

A. Who is driving innovation?

One significant character to be a winner in a business competition is always being an innovator [9]. In cloud computing, service and product developers are driving the innovation. Through the innovation, a business player may be consistently to be a first player. The first player will have more opportunities in any kind of benefits or risk.

→ Who is driving cloud innovation?

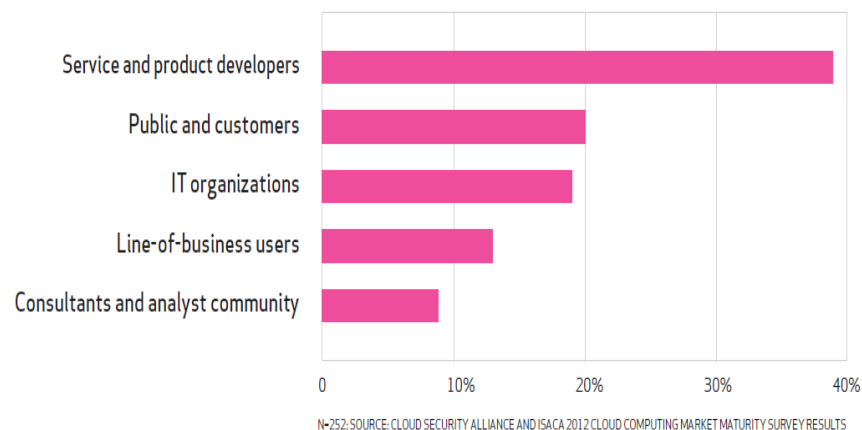


Figure 6. Who is driving innovation?

B. Cloud service maturity

An innovation need to be launched in the right timing. The right timing must consider the existing service and product maturity [9]. A case study of BlackBerry, it has come to mature and it has to compete with others. BlackBerry needs to make the BBM messaging service available on iOS and Android. Another case study of Microsoft, the company keeps launching newer version in a right timing and has dominated IT (software) business quite

long time. However, Microsoft's dominance has been increasingly threatened by the growth of cloud, consumer technology and bring your own device (BYOD) strategies. Microsoft service offerings might have reached maturity and this software giant has realized this situation. Now this giant is pushing harder with its own products for mobile device management.

→ How many years will it take for cloud services to mature?

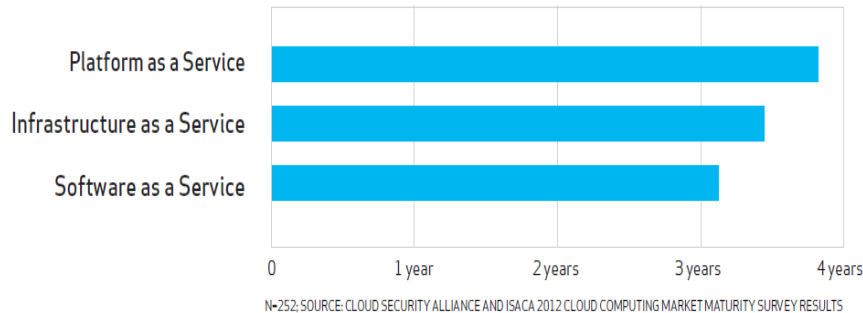


Figure 7. Cloud services matureness

VI. CLOSING REMARKS

The 'cloud' term in cloud computing is mainly interchangeable with the Internet and delivers a number of services like servers, applications and storage via the Internet. In applying Cloud Business Intelligent Systems (CBIS), the risk of implementation associated to that system must be considered. Through the implementation of the CBIS, the benefit obtained must surpass the costs of capital and compensate the risk associated to the implemented system.

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REFERENCES

- [1] *The 8 Ways Outdated ERP Damages Your Business How Cloud ERP Creates Competitive Advantage*. s.l. : NetSuite, 2011.
- [2] Mort, Ipsos. *The Deloitte Consumer Review A more secure consumer?* s.l. : Deloitte, 2013.
- [3] Decker, John E. Van. *7CFO Update: The Top 10 Technology Priorities From the 2011 Gartner FEI*

Technology Study,. s.l. : Gartner FEI Technology Study, May 2011.

- [4] Hogan, Oliver and Mohamed, Shehan. *THE CLOUD DIVIDEND: Part Two*. s.l. : Centre for Economics and Business Research Ltd (CEBR), February 2011.
- [5] McAfee, Andre. What Every CEO Needs to Know About The Cloud. *Harvard Business Review*. November, 2011.
- [6] *Statistik UKM*. s.l. : Departemen Industri Kecil, 2009.
- [7] Analysis, McKinsey Global. *US Jobs Survey 2011*. s.l. : McKinsey Global Institute, 2011.
- [8] Anderson, David P. Future of Volunteer Computing. *Crossroads*. Spring, 2010, Vol. 16, 3.
- [9]. *Cloud Computing Market Maturity Survey Result*. s.l. : Cloud Security Alliance and ISACA, 2012.